

equivalent arrangements not heretofore described, but which are commensurate with the spirit and scope of the invention. Accordingly, the invention is not to be seen as limited by the foregoing description, but is only limited by the scope of the appended claims.

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What is claimed as new and desired to be protected by Letters Patent of the United States is:

U.S. GOVERNMENT RETAINS TITLE UNLESS AND UNTIL PAYMENT IS MADE TO THE UNITED STATES OF AMERICA FOR THE USE THEREOF.

Sub a'

1. A semiconductor device comprising:

a solder mask;

a die; and

5 an adhesive layer between said die and said solder mask, wherein said adhesive layer is at least partially cured at a temperature below about 100°C.

2. The semiconductor device of claim 1, wherein said adhesive layer is at least fifty percent cured at a temperature below about 100°C.

Sub a₂'

3. The semiconductor device of claim 1, wherein said adhesive layer is fully cured at a temperature below about 100°.

4. The semiconductor device of claim 1, wherein said adhesive layer is cured at a temperature between about 20°C and about 50° C higher than the glassy temperature of said adhesive layer.

15 5. The semiconductor device of claim 4, wherein said adhesive layer is cured at a temperature below about 85°C.

6. The semiconductor device of claim 5, wherein said adhesive layer comprises a material with a glassy temperature between about 5°C and about 20°C.

7. The semiconductor device of claim 6, wherein said adhesive layer comprises bismaleimide.

8. The semiconductor device of claim 7, wherein said adhesive layer consists essentially of bismaleimide.

9. The semiconductor device of claim 1, wherein said adhesive comprises initiators which react at a temperature below about 100°C.

5 10. The semiconductor device of claim 1, further comprising electrical contacts on said solder mask and said die, each said contact on said die being wire bonded to a respective said contact on said solder mask.

11. The semiconductor device of claim 10, wherein said contacts are substantially free of contaminants from said adhesive layer.

10 *Sub A3* 12. A semiconductor device comprising:
a solder mask;
a die;
electrical contacts on said solder mask and said die, each said contact on said die being wire bonded to a respective said contact on said mask, and
15 an adhesive layer affixing said die to said solder mask, wherein said adhesive layer is cured at a temperature between about 20°C and about 50° C higher than a glassy temperature of said adhesive layer and said curing temperature is below about 100°C.

20 13. The semiconductor device of claim 12, wherein said adhesive layer is at least partially cured at a temperature below about 100°.

14. The semiconductor device of claim 13, wherein said adhesive layer is at least fifty percent cured at a temperature below about 100°C.

15. The semiconductor device of claim 12, wherein said adhesive layer is cured at a temperature below about 85°C.

5 16. The semiconductor device of claim 15, wherein said adhesive layer comprises a material with a glassy temperature between about 5°C and about 20°C.

17. The semiconductor device of claim 16, wherein said adhesive layer comprises bismaleimide.

10 18. The semiconductor device of claim 17, wherein said adhesive layer consists essentially of bismaleimide.

19. The semiconductor device of claim 12, wherein said adhesive comprises initiators which react at a temperature below about 100°C.

20. The semiconductor device of claim 12, wherein said contacts remain relatively free of contaminants released during a cure process.

15 21. A method of making a semiconductor device comprising:
affixing a solder mask to a semiconductor die with an adhesive layer; and
at least partially curing said adhesive layer by exposing said adhesive layer to a temperature no greater than 100°C.

22. The method of claim 21, further comprising:
electrically connecting contacts on said die with contacts on said solder

mask;

attaching a chip to said solder mask; and
encapsulating said die; solder mask and chip with a mold.

23. The method of claim 23, wherein said mold encapsulates at a
5 temperature of greater than about 100°C.

24. The method of claim 23, wherein said mold encapsulates at a
temperature of about 180°C.

25. The method of claim 23, further comprising curing said mold.

26. The method of claim 25, wherein said mold curing is at about 175°C.

10 27. The method of claim 21, wherein said adhesive layer is partially cured at
a temperature below about 100°.

28. The method of claim 27, wherein said adhesive layer is at least fifty
percent cured at a temperature below about 100°C.

15 29. The method of claim 21, wherein said adhesive layer is cured at a
temperature between about 20°C and about 50° C higher than glassy temperature of
said adhesive layer.

30. The method of claim 29, wherein said adhesive layer is cured at a
temperature below about 85°C.

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